

AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended): A hole forming tool which rotates around a rotational axis, comprising:

one or more chip discharging grooves which are helically formed around a rotational axis in an exterior surface of said hole forming tool, said chip discharging grooves having an inner surface; and

one or more cutting edges which are formed along ridge lines between inner surfaces of said chip discharging grooves, which are facing the rotating direction, and flank faces formed at an end of said hole forming tool,

wherein a main body of said hole forming tool is constructed of a cemented carbide which comprises  $10\pm 2$  wt % Co,  $0.65\pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities, a radial rake angle of said cutting edges is set to a negative value in a range of  $-5^\circ$  to  $-10^\circ$ , a point angle thereof is in a range of  $125^\circ$  to  $135^\circ$ , a groove width ratio thereof is in a range of 0.9 to 1.1 and wherein a core diameter thereof is in a range of  $0.38D$  to  $0.42D$ , wherein  $D$  comprises a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.

Claim 2 (Canceled)

Claim 3 (Previously Presented): A hole forming tool according to claim 1, wherein a helix angle of said chip discharging grooves is in a range of  $5^\circ$  to  $15^\circ$ .

Claims 4-5 (Canceled)

Claim 6 (Currently Amended): A hole forming tool which rotates around a rotational axis, comprising:

one or more chip discharging grooves which are helically formed around a rotational axis in an exterior surface of said hole forming tool; and one or more cutting edges which are formed along ridge lines between inner surfaces of said chip discharging grooves, which face a rotating direction of said hole forming tool, and flank faces formed at an end of said hole forming tool,

wherein a main body of said hole forming tool is constructed of a cemented carbide which comprises  $10\pm 2$  wt % Co,  $0.65\pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities, a radial rake angle of said one or more chip discharging cutting edges is set to a negative value in a range of  $-5^\circ$  to  $-10^\circ$ , a point angle is in range of  $125^\circ$  to  $135^\circ$ , a helix angle of said chip discharging grooves is in a range of  $5^\circ$  to  $15^\circ$  and wherein a core diameter thereof is in the range of  $0.38D$  to  $0.42D$ , wherein  $D$  comprises a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.

Claim 7 (Currently Amended): A hole forming tool which rotates around a rotational axis, comprising:

one or more chip discharging grooves which are helically formed around a rotational axis in an exterior surface of said hole forming tool; and

one or more cutting edges which are formed along ridge lines between inner surfaces of said chip discharging grooves, which are facing the rotating direction, and flank faces formed at an end of said hole forming tool,

wherein a main body of said hole forming tool is constructed of a cemented carbide which comprises  $10\pm 2$  wt % Co,  $0.65\pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities, a radial rake angle of said one or more chip discharging cutting edges is set to a negative value in a range of  $-5^\circ$  to  $-10^\circ$ , wherein a point angle thereof is in a range of  $125^\circ$  to  $135^\circ$ , and wherein at least parts thereof including said cutting edges comprise a cemented carbide and an average particle diameter of WC, comprised of said cemented carbide, is in a range of 0.1 to 1.0  $\mu$ m and wherein a core diameter thereof is in a range of  $0.38D$  to  $0.42D$ , wherein  $D$  comprises a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.

Claim 8 (Previously Presented): A hole forming tool according to one of claim 7, wherein a groove width ratio is in a range of 0.9 to 1.1.

Claim 9 (Canceled)

Claim 10 (Previously Presented): A hole forming tool according to one of claim 7, wherein a helix angle of said chip discharging grooves is in a range of  $5^\circ$  to  $15^\circ$ .

Claim 11 (Currently Amended): A hole forming tool which rotates around a rotational axis, comprising:

one or more chip discharging grooves which are helically formed around a rotational axis in the exterior surface of said hole forming tool; and

one or more cutting edges which are formed along ridge lines between inner surfaces of said chip discharging grooves, which face a rotating direction of said hole forming tool, and flank faces formed at an end of said hole forming tool,

wherein a main body of said hole forming tool is constructed of a cemented carbide which comprises  $10\pm 2$  wt % Co,  $0.65\pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities, a radial rake angle of said one or more chip discharging cutting edges is set to a negative value in a range of  $-5^\circ$  to  $-10^\circ$ , wherein a point angle thereof is in a range of  $125^\circ$  to  $135^\circ$ , at least a part thereof including said chip discharging grooves of said hole forming tool is coated with a layer constructed of a hard material and wherein a core diameter thereof is in a range of  $0.38D$  to  $0.42D$ , wherein  $D$  comprises a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.

Claim 12 (Previously Presented): A hole forming tool according to one of claim 11, wherein a groove width ratio is in a range of 0.9 to 1.1.

Claim 13 (Canceled)

Claim 14 (Previously Presented): A hole forming tool according to one of claim 11, wherein a helix angle of said chip discharging grooves is in a range of  $5^\circ$  to  $15^\circ$ .

Claim 15 (Canceled)

Claim 16 (Currently Amended): A hole forming tool which rotates around a rotational axis, comprising:

one or more chip discharging grooves which are helically formed around a rotational axis in an exterior surface of said hole forming tool; and

one or more cutting edges which are formed along ridge lines between inner surfaces of said chip discharging grooves, which are facing a rotating direction, and flank faces formed at an end of said hole forming tool,

wherein a radial rake angle of said one or more chip discharging cutting edges is set to a negative value in the range of  $-5^{\circ}$  to  $-10^{\circ}$ , a point angle is in a range of  $125^{\circ}$  to  $135^{\circ}$ , ~~a the~~ the main body of said hole forming tool is constructed of a cemented carbide which comprises  $10 \pm 2$  wt % Co,  $0.65 \pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities and wherein a core diameter thereof is in a range of  $0.38D$  to  $0.42D$ , wherein  $D$  comprises a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.

Claim 17 (Currently Amended): A method of constructing a hole forming tool which is rotatable about a rotational axis, comprising:

helically forming one or more chip discharging grooves around the rotational axis and in an exterior surface of said hole forming tool, a main body of said hole forming tool being constructed of a cemented carbide which comprises  $10\pm 2$  wt % Co,  $0.65\pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities; and

forming one or more cutting edges along ridge lines between inner surfaces of said chip discharging grooves, which face the rotational direction, and flank faces formed at an end of said hole forming tool, and

setting a radial rake angle of said cutting edges to a negative value in a range of  $-5^\circ$  to  $-10^\circ$ , wherein a point angle is in a range of  $125^\circ$  to  $135^\circ$ , and wherein a groove width ratio is in a range of 0.9 to 1.1; and

forming a core diameter of the hole forming tool so as to be in a range of  $0.38D$  to  $0.42D$ , wherein  $D$  is a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.

Claim 18 (Currently Amended): A hole forming tool which rotates around a rotational axis, comprising:

one or more chip discharging grooves which are helically formed around a rotational axis in an exterior surface of said hole forming tool, said chip discharging grooves having an inner surface; and

one or more cutting edges which are formed along ridge lines between inner surfaces of said chip discharging grooves, which are facing a rotating direction thereof, and flank faces formed at an end of said hole forming tool,

wherein a main body of said hole forming tool is constructed of a cemented carbide which comprises  $10\pm 2$  wt % Co,  $0.65\pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities, a core diameter of the hole forming tool is in a range of  $0.38D$  to  $0.42D$ , wherein  $D$  comprises a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.

Claim 19 (Currently Amended): A hole forming tool which rotates around a rotational axis, comprising:

one or more chip discharging grooves which are helically formed around a rotational axis in an exterior surface of said hole forming tool; and

one or more cutting edges which are formed along ridge lines between inner surfaces of said chip discharging grooves, which are facing a rotating direction of said hole forming tool, and flank faces formed at an end of said hole forming tool,

wherein a main body of said hole forming tool is constructed of a cemented carbide which comprises  $10\pm 2$  wt % Co,  $0.65\pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities, a core diameter of the hole forming tool is in a range of  $0.38D$  to  $0.42D$ , wherein  $D$  comprises a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.

Claim 20 (Canceled)



Claim 21 (Currently Amended): A hole forming tool which rotates around a rotational axis, comprising:

one or more chip discharging grooves which are helically formed around a rotational axis in an exterior surface of said hole forming tool; and

one or more cutting edges which are formed along ridge lines between inner surfaces of said chip discharging grooves, which are facing a rotating direction[[,]] thereof, and flank faces formed at an end of said hole forming tool,

wherein a ~~the~~ main body of said hole forming tool is constructed of a cemented carbide which comprises  $10 \pm 2$  wt % Co,  $0.65 \pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities, and wherein a core diameter of the hole forming tool is in a range of  $0.38D$  to  $0.42D$ , wherein  $D$  comprises a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.

Claim 22 (Currently Amended): A method of constructing a hole forming tool which is rotatable about a rotational axis, comprising:

helically forming one or more chip discharging grooves around the rotational axis and in an exterior surface of said hole forming tool, a main body of said hole forming tool being constructed of a cemented carbide which comprises  $10\pm 2$  wt % Co,  $0.65\pm 0.25$  wt % Cr, WC for a balance thereof, and inevitable impurities; and

forming one or more cutting edges along ridge lines between inner surfaces of said chip discharging grooves, which face the rotational direction, and flank faces formed at an end of said hole forming tool, and

setting a radial rake angle of said cutting edges to a negative value in a range of  $-5^\circ$  to  $-10^\circ$ , wherein a point angle is in a range of  $125^\circ$  to  $135^\circ$ , and wherein a groove width ratio is in a range of 0.9 to 1.1; and

forming a core diameter of the hole forming tool so as to be in a range of  $0.38D$  to  $0.42D$ , wherein  $D$  comprises a cutting edge diameter of said hole forming tool and said core diameter is a diameter of a solid core of material extending out to said one or more chip discharging grooves.